



TRIBUTARY TRIBUNE

Stories and Art by Members of the Watershed Stewards Program

Year 24, District D



Salmon, red-legged frog, and mallard shaped sugar cookies. Baked by Member, Sarah Jonathan of SLO RCD. Photo credit: Sarah Jonathan.

"Let your mistakes be a learning opportunity... Being faced with challenges is how you learn to figure things out... While in WSP I learned that I can do almost anything I wanted to if I put in some effort... Everyone starts somewhere. WSP was my start."

- Sony Vang

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We're All Scientists Here

By: Brianna Demirci placed at Resource Conservation District of Santa Monica Mountains (RCD SMM)

It's no secret that California experienced a drought from 2012 to 2017. Officially, the rains of 2017 prompted the governor to lift the state of emergency, but the effects of the past five years have left their mark. As a result, the Santa Monica Mountains have recently experienced massive tree die-offs. After some investigating it was determined that between the stress of the hot and dry weather patterns, as well as the infestation of invasive bark beetles, the trees, and subsequently the health of the creeks, were declining. This is because these trees provide vital habitat, shade, and structure to the creeks, and without them the species that call these creeks home, such as the Southern Steelhead Trout, have also suffered.

When it comes to something as complex as a statewide drought it can feel as though nothing can be done, and that we can only wait for better weather and hope that fewer trees die in the future. Unfortunately, waiting around is currently not an option. One of the first lessons I learned while at the Resource Conservation District of the Santa Monica Mountains is that it's time to start involving the public as citizen scientists.

Story continued on page 4 >>>



A program of the California Conservation Corps, WSP is one of the most productive programs for future employment in natural resources. WSP is administered by California Volunteers and sponsored by the Corporation for National and Community Service.





SJRP Member, Dominic Goshert, cleaning a salmon tank at Salmon Conservation and Research Facility. Photo credit: Angelica Kahler.

“...of the 31 distinct salmon and trout species California is home to, 23 are set to go extinct before the end of the century...14 Californian salmonid species will disappear in the next five decades. ”

- “State of Salmonids II: Fish in Hot Water”

(Moyle, Lusardi & Samuel, 2017)

Environmental Impacts of Marijuana Cultivation Before and After Statewide Legalization

By: Dominic Goshert placed at San Joaquin River Parkway (SJRP)

California has long been notorious for its cannabis cultivation. Ever since the legalization of medicinal marijuana in 1996, the state has been one of the few legal spaces for pot growth in the nation. As a result, approximately 60% of the cannabis consumed in the United States is now grown in California.² Most of this growth occurs in the counties of Humboldt, Mendocino and Trinity, otherwise known as the Emerald Triangle.

Studies on watershed impacts of the expanding marijuana industry are ongoing, and it has become clear that the current practices utilized by growers are negatively impacting local waterways. Many growers are using irrigation lines which divert water directly from streams and creeks that feed into larger bodies of water such as the Eel River.¹ This water demand for cultivation proves problematic during the low-flow periods in the summer when most of the watering by growers occurs. The large-scale diversion of water from creeks and streams has caused water levels to plummet, with some streams drying up completely. This causes local rivers to become unsustainable for salmonids.² Additionally, grower activities such as the construction of roads and the clearing of land to create space for planting, causes soil erosion. This erosion clouds creeks and streams, coating riverbeds where salmon and trout breed, suffocating the eggs before they hatch.

Problems such as these have caused environmentalists to question whether or not legal cannabis truly is a sustainable industry. The legalization of recreational marijuana in the state of California will undoubtedly bring about a drastic increase in pot growers. Humboldt County has already received thousands of new applications for growing permits since the results of the November elections were announced.¹ If these new growers add to the impacts already seen in the Emerald Triangle, it could spell disaster for Chinook Salmon and Steelhead Trout in the region.

Story continued on page 3 >>>



SJRP Member, Dominic Goshert, hauling invasive plants. Photo credit: Lauren Malinis.

Conservation, Collaboration and Community

By: Sal Zaragoza placed at San Luis Obispo Resource Conservation District (SLO RCD)

Centennial Creek in Paso Robles, CA is a tributary to the Salinas River, the longest river of the Central Californian coast. It is an ephemeral creek that provides habitat for numerous wildlife species including the threatened California red-legged frog, and the endangered least Bell's vireo. Urbanization of this watershed has contributed to the degradation of the creek, resulting in the loss of wildlife habitat and spread of pollution. The Centennial Creek Restoration Project was developed by the Upper Salinas-Las Tablas Resource Conservation District (US-LT RCD).

Story continued on page 4 >>>

About the Watershed Stewards Program

Since 1994, the Watershed Stewards Program (WSP) has been engaged in comprehensive, community-based, watershed restoration and education throughout coastal California.

WSP was created in 1994 by California Department of Fish and Wildlife (CDFW) biologists, educators, and the California Conservation Corps to fill critical gaps in scientific data collection, in-stream restoration, and watershed education. In collaboration with landowners, tribal communities, teachers, community members, nonprofit organizations, and government agencies, WSP works to revitalize watersheds that contain endangered and threatened salmonid species (Chinook Salmon, Coho Salmon, and Steelhead Trout) by using state-of-the-art data collection and watershed restoration techniques. WSP also engages members in education, outreach, and volunteer recruitment efforts to increase the capacity of partner organizations. WSP currently has Members working from the Oregon border to the Santa Monica Mountains.

Environmental Impacts of Marijuana Cultivation Before and After Statewide Legalization, *continued from page 2*

Some environmental scientists remain optimistic however, stating that legalization will make it easier to regulate grower activities and monitor their effects on local watersheds. What was previously an unorganized and unstructured industry could become well-regulated and sustainable, as long as growers adhere to the rules put forth by the California Department of Fish and Wildlife's (CDFW) Watershed Enforcement Program (WEP).

The WEP is made up of Watershed Enforcement Teams throughout the state of California and was created to better regulate cannabis cultivation on private land. Through the WEP, the CDFW as well as the State Water Resources Control Board work to enforce regulations associated with cannabis cultivation, including violations of the CDFW code as well as violations of water quality laws.³ The program works under the direction of the Strategic Plan drafted in 2014 by the CDFW in collaboration with the different water control boards. Legalization will most likely lead to new challenges for the WEP as the number of growers requesting permits to operate legally in the state increases. However, as long as the program is able to adapt to this increase in workload legalization could mean a new chapter in sustainable marijuana cultivation.

Resources:

¹Bland, Alastair. (22 March 2017). How Changing Marijuana Laws May Affect California's Water and Wildlife. *News Deeply*. Retrieved from <https://www.newsdeeply.com/water/articles/2017/03/22/how-changing-marijuana-laws-may-affect-californias-water-and-wildlife>

²Kaye, Melati. (2 February 2017). Burgeoning Marijuana Market Prompts Concerns about Crop's Environmental Impact. *Scientific American*. Retrieved from <https://www.scientificamerican.com/article/burgeoning-marijuana-market-prompts-concerns-about-crop-s-environmental-impact/>

³CDFW. (2017). Watershed Enforcement Program. Retrieved from <https://www.wildlife.ca.gov/Conservation/Cannabis/WEP>



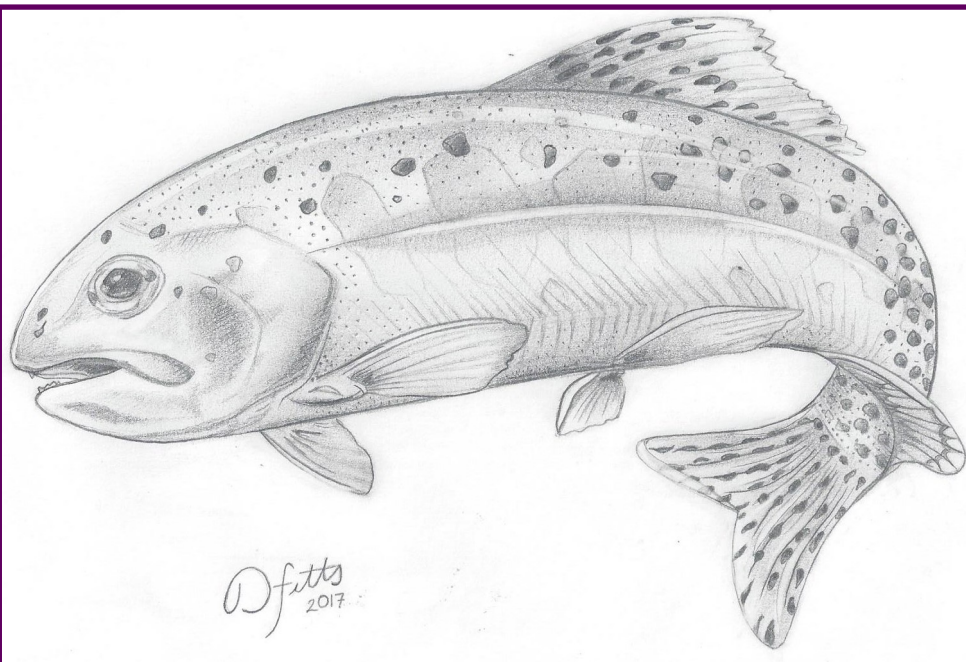
WSP Team Leaders, Tessa Jensen Wolf and Angelica Kahler, unfloating their waders at Swift Water Rescue Training. Picture credit: Sierra Rescue International.

We're All Scientists Here, *continued from page 1*

My favorite definition of the term "Citizen Scientist" comes from a report authored by Cornell professor Bruce Lewenstein. He states that citizen science encompasses "the participation of nonscientists in the process of gathering data according to specific scientific protocols".¹ I like this explanation because it shows that one does not need to have a degree to make an impact. It's easy to think this is something that only government officials and prestigious university scientists can tackle, but sometimes it is the acts of the public that end up making the biggest difference. The RCDSMM is no stranger to the practice of involving community members. Being such a small office hidden in the hills of Topanga, it would have been impossible to collect the valuable tree data and beetle samples from over 850 samples spanning 46 trap sites between the spring and fall of 2017 without help. Over 30 volunteers contributed over 2,000 hours of time to assist with this project. Thanks to this data, local park agencies, cities, and counties can develop strategies to respond to these threats. Science equals data, and with the right training and instructions data can be collected by anyone.

References

¹B. Lewenstein (8 June 2004). "What does citizen science accomplish?". Cornell University. Retrieved 16 September 2014.

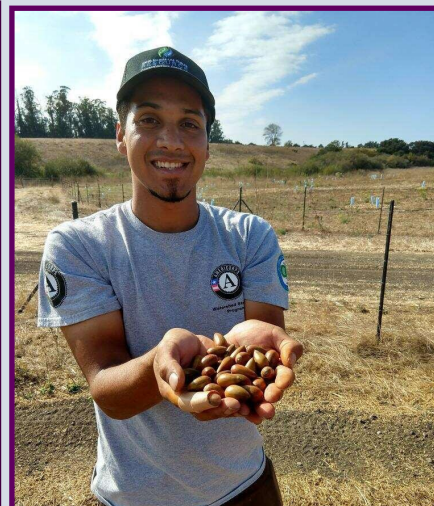


Drawing titled Fish in Hot Water. Illustrated by Member, Danielle Fitts of CDFW Santa Barbara.

Fish in Hot Water

By: Danielle Fitts placed at California Department of Fish and Wildlife in Santa Barbara (CDFW SB)

I got the inspiration for this piece after participating in my first ever fish rescue. In November of 2017, a single trout was stranded in a rapidly depleting pool in dire need of saving. I was able to assist a team of California Department of Fish and Wildlife and Pacific State Marine Fisheries Commission experts in a successful emergency rescue and relocation.



SLO RCD Member, Sal Zaragoza, holding oak seedlings. Photo credit: Sarah Jonathan.

Conservation, Collaboration, and Community, *continued from page 2*

This project was developed to restore the degraded creek, and provide opportunities to educate community members about the benefits of environmental stewardship. In addition, US-LT RCD used WSP Members to assist in the implementation of the project, a move that freed funds in the budget for further restoration of the creek.

Centennial Creek is located within an urban area which makes restoration activities visible to the public. US-LT RCD did this purposefully to initiate environmental stewardship within community members. On implementation day, community members ranging from high school students to retirees stopped to ask who US-LT RCD and WSP are, what the project was, and they showed appreciation for the restoration efforts. As the Centennial Creek Restoration Project continues to develop, the US-LT RCD expects its collaboration with WSP and the community will lead to more responsible stewardship of this local watershed. They also hope to gather momentum for further watershed conservation in the Paso Robles area.

Central Coast Native Planting Guide

By: Sarah Jonathan placed at San Luis Obispo Resource Conservation District

The following is a guide to some of the plant species native to the California Central Coast and used to restore Centennial Creek, as described in the article on page 1 titled “Conservation, Collaboration, and Community” by Sal Zaragoza, to improve habitat and hydrologic functioning.

Mulefat (*Baccharis salicifolia*)

Also known as water-wally or seepwillow, this is a tall shrub that resembles a willow. It is a quick growing, perennial plant that typically grows six to twelve feet in height. The leaves of mulefat are long and skinny, sometimes exhibiting serrated edges, and are medium to dark green in color. Small, pink to white, fuzzy flowers can be seen on the plant year-round.

Toyon (*Heteromeles arbutifolia*)

Toyon is a perennial shrub that often grows eight to twelve feet tall. The alternately arranged leaves are dark green with a leathery texture. They are ovate with serrated edges and spines and are about 2 inches long. Toyon displays small, white flowers in bunches in the summer and bright red berries from the fall until winter. Toyon is also called Christmas berry or California holly.

Coffeeberry (*Frangula californica*)

Also called California buckthorn, this is a perennial shrub that typically grows six to ten feet tall. The alternately arranged leaves are dark green with a leathery texture. They are ovate with smooth edges and about 3 inches long. Coffeeberry displays small, yellow-green flowers in summer and produces small stone fruit that turn from red to purple black in the fall.

California Sycamore (*Plantanus racimosa*)

This deciduous tree grows 60 to 75 feet tall with the trunk reaching 3 feet in diameter. Sycamore trunks often split into multiple main trunks with mottled white and grey bark. The leaves are large, up to ten inches across, and have distinct lobes. Spring flowers are spherical and develop into seed-balls in summer.

Deergrass (*Muhlenbergia rigens*)

Deergrass is a fast growing, perennial grass with pointed leaves up to four feet long and half an inch wide. It has a fountain shape with mounds growing four feet wide. This plant ranges in color from a silverish to deep green to purple with white to yellow flowers on five-foot stalks.

References

California Native Plant Society. “Calscape.” 1999, [calscape.org](https://www.calscape.org/).

Natural Resource Conservation Service. “Plants Database.” United States Department of Agriculture, 14 Dec. 2017, <https://plants.usda.gov/java/>.

Photos accredited to Sarah Jonathan.



Mulefat.



Toyon.



Coffeeberry.



Mature Sycamore.



Deergrass.

California: A Salmon State?

By: Angelica Kahler placed at WSP San Luis Obispo

When I became a Member with the Watershed Stewards Program (WSP) my knowledge of anadromous fish could best be described as limited and when I came across WSP's job posting, my interests were immediately piqued. "Wait," my inner voice shouted, "there are salmonids in California?! Southern California?!?" This I had to study! How could Southern California have ever been an ideal environment for this cold-water, Pacific Northwest loving fish? As I sat down to write this article I decided to answer a question that has been gnawing in the back of my mind since I began my term of service with WSP, "where did these salmonids come from, where did they go, and why?"

Two million years ago salmon and trout showed up in huge numbers from Baja all the way to Alaska.³ Over the years these numbers have steadily declined, until recently, when they took a massive plummet. A potential reason for such a rapid deterioration? Climate change. The exponential rate at which the climate appears to be changing as human population coincidentally booms is both frightening and compelling. As the climate warms, weather patterns become more extreme. Heat in the atmosphere causes catastrophic conditions on Earth's surface. Average temperatures rise and plants and animals that have evolved to handle a very specific environment cannot keep up with this rate of change. California has not been immune to climate change's adverse effects. A drought was declared in the Golden State three years ago but, as any good climate scientist knows, it takes three years of repeated similar weather patterns to define a climate.⁴ So California's drought actually began in 2011. What has since ensued have been the driest years this state has seen in modern history. After record rains in 2016, bans regarding the drought were officially lifted. Unfortunately, many Californians took this as terrific news and immediately began watering their brown lawns once more. Though drought restrictions have been lifted, the effects will last decades, and while surface water and snowmelt have made a recovery, groundwater hasn't. California aquifers run dry, and this is where the bulk of our water has come from since 2011.⁴ With these depleted resources many fish populations took a beating, but none more brutal than Californian salmonids.

Story continued on page 14>>>



WSP Team Leader, Angelica Kahler measuring a sun fish. Photo credit: Lauren Malinis.



District D acting fishy during WSP Orientation. Photo credit: Jody Weseman.



Steelhead caught at Marin Municipal Water District. Photo credit: Justine Brumm And Gabrielle Guaiumi.

Cactus Garden

By: Evelyn Barajas-Perez placed at San Luis Obispo Steelhead Initiative (SLO SI)

Lack of diversity in the environmental world is a striking and controversial topic that rarely comes up. Diversity, much like in nature, is a necessity to strengthen any environment. In this case, that environment is the natural resources field. Similar to the water needed by plants, knowledge and experience are needed to expand the environmental field.

As a first generation Mexican- American, I faced a lot of issues as one of the few non-white students in school. Much like the environmental field, my schools lacked diversity. I couldn't hide where my parents and I came from, as my mother says, "Tienes el nopal en frente" which means I have a cactus on my face. However, in the less literal sense, it means that I have a genetic stamp that says "made in Mexico" on my forehead. Sticking out at school made me feel a little like an outcast when I was growing up. Regardless of that stamp, I am now pursuing a career in the environmental field through the Watershed Stewards Program (WSP). My path would have probably been easier if I had more Mexican role models in school. We would have gone through similar situations and they would have had a better understanding of how to help me through certain difficulties. I believe, the more role models we have coming from more diverse backgrounds, the more people they will inspire. This will, in turn, produce a more diverse environmental community. I feel lacking familiarity with your peers in the environmental field plays a huge role in why many minorities don't pursue a career in it. For example, Lisa Rachal, a fellow WSP Member placed at the Santa Barbara Steelhead Cooperative, said that she would regularly feel out of place in college because in her major, Environmental Science and Geography, she was usually the only person of color. It is hard to convince people from minority groups to approach something that doesn't feel inclusive. I believe outreach is a key factor in attaining diversity and thus, increasing the inclusivity that we lack.

Story continued on page 8>>>

From North to South

By Timothy Scully placed at San Luis Obispo Steelhead Initiative

Leaving Humboldt State was anything but easy, but I knew my time behind the redwood curtain had ended for the time being. I now had to leave the ancient forests and wild rivers that I had learned to love in my four short years on the north coast to relocate to an area that might as well have been a foreign country, Central California. I knew San Luis Obispo and the central coast had a reputation for being a beautiful place, but I had to ask myself when I was accepted into the Steelhead Initiative, "Is there even any water down there!?" I discovered that the answer is "yes", but obviously in much smaller quantities. But what simple creek could stand up to the mighty Klamath River? What babbling brook could be bluer than the Smith? They would never be like the rivers of my college years I soon discovered, but that doesn't mean they couldn't be special.

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Cactus Garden, continued from page 7

Programs like WSP are attempting to tackle a lack of diversity in environmentalism. WSP connects recent graduates from a diverse set of backgrounds with professors and communities all over California. WSP also utilizes these students and professors to spread the word and mission of the program. As WSP expands, it is beginning to reach people from all types of ethnicities and backgrounds. Their Wonders of Watersheds curriculum allows Members to teach children from Title 1 schools about salmonids and watersheds; children that otherwise may never have been exposed to this type of learning. Other programs, such as the California Conservation Corps, Sierra Club, and Make Life Count are going out and reaching into their communities with the hope that they will touch more people.

Even though the trek towards a more diverse field seems long, I stand hopeful. I foresee a future filled with an array of people from different backgrounds. It will be these people who obtain the waters of knowledge, that will equip themselves with watering cans and carry them far and wide; because, after all, it only takes a little water to make a cactus garden flourish.



Drawing by SLO SI Member, Evelyn Barajas, to accompany article titled "Cactus Garden".



SLO SI Member, Evelyn Barajas-Perex, doing eel grass surveys in Morro Bay. Photo credit: Karissa Willits.

From North to South, continued from page 7

If you ask any layperson in Humboldt County about the rivers and fish around the area they can give you a pretty educated answer, this isn't the case in San Luis Obispo County in my opinion. Of course, this isn't true for everyone in San Luis Obispo County, but the culture is certainly different here than on the North Coast. The creeks and streams in this area are a hidden world full of life, and I have the privilege of working in areas that many people don't give a second thought about. It is even more special meeting someone from the area who isn't aware that there are fish in the creeks, and telling them about steelhead and creek restoration. My Placement Site partner, Evelyn, and I are often asked if there are "even any fish in there" while doing field work around SLO county. "Yes", we say which is often followed by, "but they don't make it this far up the creek do they?", to which we reply "Yes, they do!". WSP's presence in this region is relatively recent, and we are bringing a different perspective and culture to these southern communities. I get the opportunity to help open people's eyes to the beauty that has been right in front of them all along.

It's Not a Hatchery?

By Lauren Malinis placed at San Joaquin River Parkway

As a WSP Member, I sometimes spend days working at the Salmon Conservation and Research Facility (SCARF). The SCARF is connected to the California Department of Fish and Wildlife (CDFW) in Fresno. SCARF, in many ways, works like a hatchery. Eggs are harvested from Chinook Salmon and fertilized. The developing eggs are incubated. Fish that hatch from the eggs are cared for as they grow. The facility started out as a single trailer. Staff at the SCARF had noticed that they were not getting the desired support from other CDFW workers until it was empathized that this was to be a “conservation facility” as opposed to a “hatchery.”

The word hatchery carries a certain connotation, which is sometimes viewed as negative. Hatcheries are thought of as a means of raising fish solely for commercial purposes. Salmon are often raised as food or to stock ponds for fishermen. Often these facilities raise fish without concern for the species as a whole. There may be inbreeding occurring, which reduces the health of individuals as generations pass, and can affect native stocks if such fish are released. Hatcheries are often looking to create fish with more meat or fresher color, so that they will sell at a market.

What makes the SCARF and other similar facilities different is the concern for maintaining diverse genetics and potentially repopulating wild salmon. Such facilities avoid keeping multiple generations of fish in captivity, preventing domestication. They also carefully monitor the fish to look out for any abnormalities, diseases, and infections. There is an effort to breed salmon in a way that lines up with the seasonal breeding patterns of wild populations. Unfortunately, these facilities are not free of their own controversies. For instance, many will argue that these types of institutions simply put fish in the water instead of fixing whatever caused fish populations to decline in the first place.

The Chinook Salmon SCARF released into the San Joaquin River are in a particularly unique situation. Wild Chinook Salmon have actually been extinct downstream of Friant Dam. The dam, which is located just outside Fresno, is a great barrier to anadromous fish. Since these released



SJRP Member, Lauren Malinis, measuring a salmonid. Photo credit: Dominic Goshert.

chinook are most likely the only salmon in the river, reintroduced fish are able to be carefully monitored through red and carcass surveys. The surveys are conducted through a joint effort of US Fish and Wildlife Service and CDFW. Staff do their best to inform the public of these experimental fish and discourage them from catching the salmon and taking them home. Any progeny produced by the salmon are monitored and counted through fish traps.

In the end, the work that SCARF does is beyond the work that a typical “hatchery” would conduct. SCARF is considered to be the most advanced facility of its kind in the state of California. Other researchers are currently attempting to simulate a more natural environment in captivity. They are adding natural substrate into tanks and experimenting with providing the fish live feed. SCARF, meanwhile, is able to rear their fish in a controlled facility and release them into an actual natural environment. Currently, the SCARF is under construction. Hopefully within the next one to two years they will have a new space that will allow them to raise more fish and continue with their research.

A Day in the life of a WSP Member

Santa Barbara Steelhead Co-op Edition

1

Work starts at 7 am, maximizing daylight.

2

As soon as we get to the office, we clear-out the freezer. It holds the used gear from previous day.

3

A majority of the gear goes outside to dry. Waders and wetsuits go on "The Wader Tree".

4

Now it's time to figure out our day's expedition and gather gear.

5

Depending on the day, we could do a variety of tasks: snorkel surveys, PIT scanning, drought surveys, water quality, fish rescues, and more!

6

Next, we load the car and message our safety contact with where we're going and when we'll be back. Then, WE'RE OFF!

7

After our adventures are over, we conclude our day by decontaminating our gear, and scanning and filing our collected data.

8

We spend a large part of the day decontaminating our equipment. Most gear endures a rinse, submersion in 10% NaCl saltwater, another rinse, and 8-hours of freezing (sub- 32°F), then is hung to dry the next day.

Equipment that can't tolerate the saltwater is wiped with 2% diluted Virkon, placed in the freezer and left to dry. Or if freezing is out, some gear is soaked in diluted Virkon, rinsed and left to dry.

Finally, the most delicate equipment that can't tolerate saltwater or freezing is left to dry on the desiccation(drying) counter for 48hrs.

9

That wraps up our average field day in the Santa Barbara Steelhead Co-op office.

Thanks for stopping by.



By: Lisa Renee Rachal



Members (from left), Danielle Fitts, Brianna Demirci and Lisa Rachal, attending e-fishing training. Photo credit: Rosi Dagit.

There and Back Again

By Timothy Scully placed at San Luis Obispo Steelhead Initiative

They're back! Pacific lamprey were spotted in San Luis Obispo (SLO) Creek in the spring of 2017 for the first time since 2004. Their reappearance has been celebrated by those who thought they had all but disappeared from the watershed, and they seemed to have arrived in the nick of time. Among the many ecologically important roles this species plays, one is specifically being researched in the case of SLO Creek. Biologists are looking at the possibility that ammocetes (juvenile lamprey) could effectively consume fecal coliform as a food source in the absence of a prolific algal community or zooplankton availability. The Total Maximum Daily Load (TMDL) for fecal coliform has been quite high in SLO creek, despite the implementation of creek walk sewer lateral inspections (visual inspections), pet waste reduction campaigns and improved stormwater management. The City of San Luis Obispo has determined that the source of the pathogen is not anthropogenic but avian wildlife, specifically pigeons inhabiting culverts and tunnels SLO Creek passes through.

Story continued on page 12 >>>

The First Rain

By Angelica Kahler placed at WSP San Luis Obispo

My feet dangled off the banks of the San Joaquin nestled in the boulders and gravel of the riverbed. I heard the soft groaning of a heavy metal screw trap swaying in the river, at the mercy of its powerful flow.

I heard the gentle pitter patter of rain sprinkling down upon the mighty San Joaquin. I stared down, lost in the April showers of December. The first rain of the season.

Salmons' future hung in the balance and I sat useless on the shore. At 4'11 I was too short to wade to the screw trap. Instead I waited on the banks, data sheet in hand to make me feel important. I felt more like a child on bring your kid to work day.

I looked up to see three men sifting through autumn's fallen litter. Searching for juvenile salmon. For any salmon. We'd seen less than you could count on one hand that week but the rain brought with it expectations. Perhaps this December rain was a sign of change.

I looked down. The water's surface went still. It wasn't the first rain of the season after all. With its disappearance, so disappeared my hopes for a fishy future. Perhaps this year did not hold the natural recovery I anticipated.

For a moment my frustration returned and I cursed mother nature's dry state. I looked up hoping for reassurance. I didn't see salmon but I did see determination. On this wet, cold morning I saw hope. People are willing. We'll put in the work. If nature can't do it, maybe we can. Maybe salmon can make a comeback after all.

There and Back Again, *continued from page 11*

High levels of fecal coliform can be detrimental towards public health, causing illnesses such as Salmonella. Now, the City of SLO is leading an experiment to see how effective Pacific lamprey are at reducing fecal coliform levels in a controlled aquatic environment. Essentially, ammocoetes will be housed in fish tanks, the first group will be in control tanks to determine what fecal coliform may be entering the water from the ammocoetes themselves, a second group of tanks will contain a known concentration of fecal coliform and the last group of tanks will have ammocoetes and fecal coliform to determine if reduction has occurred. Fecal coliform sampling will occur four times over a 24-hour incubation time period to determine the impacts that the ammocoetes are having on the concentration of the pathogen. This experiment seeks to better understand the role of Pacific lamprey in the SLO Creek

ecosystem, and what ecological services may have been gained by their return to the watershed. However, this experiment has implications for all Pacific lamprey bearing watersheds and the conservation of the species as a whole. If ammocoetes are found to significantly reduce concentrations of fecal coliform, their conservation will be even more integral in terms of environmental health and water quality across the west coast. According to Feddy Otte, biologist for the City of SLO, similar research is being conducted in the Pacific Northwest by the Umatilla Nation to discover the impacts of Pacific lamprey in the Columbia River Basin. The Columbia River Inter-Tribal Fish Commission (CRITFC), which the Umatilla Nation is a part of, has been a leader in Pacific lamprey restoration and research on the west. This research will be an important step in understanding the ecological role of Pacific lamprey throughout all of their native watersheds.

Alumni Spotlight Article

Featuring Sony Vang from Year 22 (2015/16)
Interview By Angelica Kahler

What was your WSP Member experience like?

I enjoyed my WSP year at SJRRP immensely. My partner and I were the dynamic duo and we got stuff done together. We were a great team and that made the year a fun one. I enjoyed working with different agencies like the Parkway, CDFW and USFWS which gave me great insight into various sectors of the environmental field. I felt we made a huge impact on the schools where we implemented the Wonders of Watersheds curriculum because many students didn't even know there was a river so close to them. It was a rewarding experience.

Was there one experience that was especially memorable? Why?

There was one experience where my site partner, Ryan Lefler, and I got the truck stuck in the flood bank. Don't ask why we were driving in the flood bank but we got stuck and we tried everything. We tried to dig our way out by placing wood planks and rocks under the wheels to provide traction. We failed miserably and we finally threw in the towel and called our site Mentor notifying him of our interesting failure. It brings a smile to my face when I think about the times we spent on the river, both the failures and successes were great learning opportunities for the both of us.

Story continued on page 13 >>>



Sony Vang, WSP alumnus, working as a NOAA Corps Commissioned Officer aboard NOAA Ship Oscar Dyson. Photo credit: Sony Vang.



WSP alumnus, Sony Vang, pictured while serving as a WSP Member in Year 22, placed at SJRP. Photo credit: Sony Vang.

What are your title and responsibilities in your current job? What is involved in a typical day?

I am currently a National Oceanic and Atmospheric Administration (NOAA) Corps Commissioned Officer. I am a junior officer on the NOAA Ship Oscar Dyson. The NOAA Ship Oscar Dyson is a state of the art class of ultra-quiet fisheries research vessel which operates in the Gulf of Alaska and Bearing Sea which collects data on fish populations, marine mammals, sea birds, and marine ecosystems. As a junior officer I get to drive this 200-foot ship and maintain all the operations. Along with driving the ship, I am the Safety Officer and I plan fire drills, abandon ship drills, and man overboard drills to ensure safety and preparedness at sea. In a typical day I get to operate a 200-foot vessel and work with scientists to plan research operations. I get to drive the ship in various ways to be able to collect data such as trawling for fish with a specifically designed net behind the vessel or slow down to drop a (CTD) conductivity, depth, and temperature sensor to collect oceanographic data.

What advice would you give current WSP Members?

Let your mistakes be a learning opportunity. My favorite part of the job is the day to day challenges and the continuous adventures that each day brings. As a commissioned officer, you aren't just doing one thing and not all problems have simple answers. Being faced with challenges is how you learn to figure things out. The work diversity and adventure is my favorite part of the job.

While in WSP I learned that I can do almost anything I wanted to if I put in some effort. My position now involves driving a 200-foot vessel. I had no mariner experience prior to joining the NOAA Corps. I learned everything through training after I got in. The double-edged sword of getting jobs these days is lack of experience but I feel having the enthusiasm to dive into something you don't know and the willingness to learn is the most crucial part of being successful. Everyone starts somewhere. WSP was my start.



From upper left to right: Sarah Jonathan of SLO RCD planting oak seeds (photo credit: Sal Zaragoza); Lisa Rachal of CDFW SB smiling while taking data (photo credit Lisa Rachal); Tim Scully and Evelyn Barajas-Perez of SLO SI smiling while teaching Trout In the Classroom (photo credit Karissa Willits). From lower left to right: Bri Demirci of RCD SMM doing outreach at Channel Islands (photo credit Kelly Kazmirchuk); Dominic Goshert of SJRP cleaning salmon tank (photo credit Angelica Kahler); Danielle Fitts assessing creek flows in the Santa Barbara Mountains (photo credit Lisa Rachal).

California: A Salmon State? *continued from page 6*

A report titled, *The State of Salmonids II: Fish in Hot Water* (Moyle, Lusardi & Samuel, 2017), now predicts that of the 31 distinct salmon and trout species California is home to, 23 are set to go extinct before the end of the century. Additionally, the report predicts that 14 Californian salmon species will disappear in the next five decades. Seventy-five years ago, 100,000 - 300,000 Coho Salmon spawned each year in Northern California; today less than 5,000 make it upstream.² Coho populations are down to 1% of their historic population size.³ As UC Davis ecologist, Carson Jeffres, puts it, "California is a salmon state. People are forgetting that. And that may be the greatest long-term threat the fish face."¹ It seems even myself, a born and raised, bleeding heart, true Californian, have suffered this fate.

Though the outlook appears bleak,

salmon repopulation strides are being made in the natural resources field. Focused restoration efforts in key watersheds may save some species yet. Researchers, like Carson Jeffres, are employing agricultural lands in the Central Valley as salmon habitat, and it has proven to be a huge success. As Jeffres puts it, "Integrating the human footprint with functioning ecosystems is how we have to move forward."¹ In order to create an environment wild species can inhabit sustainably, answers must be sustainable for both human and fish species. By using such techniques to restore salmon to their historic population sizes, people might begin to see California as a salmon state once more.

Resources:

¹Bland, Alastair. (23 August 2017). California: the State of Salmon. Retrieved from <https://www.hakaimagazine.com/news/california-state-salmon/>

²Bland, Alastair. (17 May 2017). Many of California's Salmon Populations Unlikely to Survive the Century. Retrieved from <https://www.npr.org/sections/thetakeout/2017/05/17/528826774/many-of-california-s-salmon-populations-unlikely-to-survive-the-century>

³The Nature Conservancy. (2017). Why Salmon Matter. *California Salmon Snapshots*. Retrieved from <https://www.casalmon.org/why-salmon-matter>

⁴U.S. Department of the Interior. (30 November 2017). California Drought. Retrieved from <https://ca.water.usgs.gov/data/drought/>

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program on our website:**

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Our Mission

The Watershed Stewards

Program's mission is to conserve, restore, and enhance anadromous watersheds for future generations by linking education with high quality scientific practices.

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District C and D climbing a tree during WSP's Region II Training. Photo credit: Meredith Hardy.

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